

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in Couplings for Rock Drill Bits or Drill Rods

We, **AKTIEBOLAGET ATLAS DIESEL**, of Sickla near Stockholm, Sweden, a Company registered under the laws of Sweden, and **SVEN ERIK RYD**, of 14, Mysingsvägen, Djursholm, Sweden, a subject of the King of Sweden, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to improvements in couplings for rock drill bits or drill rods comprising an internally screw-threaded coupling sleeve and correspondingly screw-threaded portions on drill bits, drill steels or drill rods.

In this specification "drill bit" or "detachable bit" is used to indicate a short cutting implement which is screwed or otherwise secured to the end of a rod to form a tool suitable for a rock drilling machine, "drill steel" is used to indicate a longer cutting implement having a cutting edge or edges at one end and adapted to be fitted into a rock drilling machine with its opposite end, "drill rod" is a rod adapted to receive a detachable drill bit at one end and to be fitted in a rock drilling machine with the other end or a rod forming an intermediate part of a very long rock-drilling implement, and "drill shank" is the portion of a drill steel or drill rod formed to fit the chuck of a rock drilling machine. Drill shanks are usually made integral with the drill steels or drill rods but may also be carried out as a separate part screwed or otherwise secured to a drill steel or a drill rod.

It is common practice to provide tools used in connection with rock drills and other drills intended for operation in hard material with detachable bits provided in the end opposite the cutting end with an externally screw-threaded end portion intended to abut against the end of a drill rod and to be secured to said drill rod by means of an internally screw-threaded coupling sleeve enclosing the screw-

threaded end portion of the drill bit and a correspondingly screw-threaded end portion of the drill rod. It is also old to provide a drill rod with a detachable shank forming an internally screw-threaded sleeve which may be screwed onto a screw-threaded end portion of another drill rod.

One object of the present invention is to provide a coupling of the type indicated hereinabove which requires little radial space and in which a very shallow screw-thread is used which materially reduces the risk of fractures in the screw-threaded end portions. A further object of the invention is to make possible a very small diameter of the drill bit as compared with the drill rod diameter so that an increased strength of the drill bit is obtained at a given core diameter of the screw-threaded end portions.

The coupling according to the invention consists of a sleeve with the internal screw-threads and at least one screw-threaded end portion of a drill bit, a drill steel or a drill rod, which end portion has a rounded screw-thread and is kept abutting against an end surface of a drill rod, a drill steel, or a drill shank by means of said internally screw-threaded sleeve, and the invention is principally characterized by this that the pitch of the screw-threaded end portion is more than one third of and less than twice the core diameter of the screw-threaded end portion and that the profile of the screw-thread at the root of the screw-thread of the end portion has a radius of curvature larger than half the pitch.

On the accompanying drawing one embodiment of a coupling according to the invention is illustrated by way of example. Fig. 1 is a side view and partial section of a detachable drill bit and a drill rod provided with a coupling according to the invention. Fig. 2 is a longitudinal section in a plane perpendicular to the plane of Fig. 1 of the drill bit illustrated in Fig. 1.

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In Fig. 1, 1 designates a drill rod, 2 a detachable drill bit, and 3 an internally screw-threaded sleeve, which connects the drill bit with the drill rod. The drill bit may be of any design with regard to the purpose for which it is intended and is illustrated in the drawing as a chisel bit. The cutting edge of the bit is formed on an insert 4 of hard metal. The hard metal insert 4 is fitted in a groove extending in the direction of the edge in the body of the bit and is permanently secured in said groove by means of hard-soldering.

In order that the heating of the bit necessary for hard-soldering the insert shall not spoil the strength of the bit and cause fractures the bit is formed without sudden changes in the cross section so that weak points are avoided which might otherwise be exposed to undue stresses. At the end of the bit opposite the cutting edge a screw-threaded end portion 5 is provided which is kept abutting against a similar end portion on the drill rod by means of the sleeve 3 as obvious from Fig. 1.

Since the connection between the drill bit and the drill rod is situated rather far away from the soldered insert the end portion 5 may be hardened, and is not annealed upon soldering of the insert. A reliable connection between the drill rod and the drill bit is thus possible. All sudden changes of the cross section between the screw-threaded end portion and the rest of the drill bit which might form incipiences to fractures should be avoided.

Since the sleeve 3 is a separate part said sleeve may be made of the most suitable material and may also be heat-treated independently of the heat treatment of the drill bit and the drill rod.

The screw-thread of the screw-threaded end portion 5 as well as of the screw-threaded end portion of the drill rod 1 and the sleeve is made very shallow with a rounded profile. The external diameter of the coupling may therefore be reduced permitting a corresponding reduction of the diameter of the drill bit. The reduction of the diameter of the drill bit permits an increase in the drilling speed and results in a reduction of the manufacturing costs.

The large pitch of the screw-thread is used in order to make the screw-thread resistant to wear and in order to reduce the pressure on the screw-thread resulting from the turning of the drill bit. According to the invention the pitch of the screw-thread of the screw-threaded end portions is more than one third of and less than twice the core diameter of the screw-threaded end portion 5 and the

correspondingly screw-threaded end portions of the drill rods. Furthermore, the profile of the screw-thread at the root of the screw-thread of said end portions has a radius of curvature which is larger than half the pitch. The crest of the screw-threads of said end portions is formed with a radius of curvature less than the radius of curvature at the root of the screw-thread. The sleeve has a screw-thread formed so as to mesh perfectly with the screw-threaded end portions.

The coupling according to the invention may naturally be modified in several different ways within the scope of the claims. The sleeve 3, for instance, may be used for connecting a drill bit to a drill rod or for connecting a drill steel and a drill rod or for connecting successive drill rods. Furthermore, a shank for a hammer drill may form a sleeve at one end said sleeve being adapted to connect the shank with a screw-threaded end portion of a drill steel or a drill rod, respectively.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A coupling comprising a sleeve with internal screw-threads and at least one screw-threaded end portion of a drill bit, a drill steel or a drill rod, which end portion has a rounded screw-thread and is kept abutting against an end surface of a drill rod, a drill steel, or a drill shank by means of said internally screw-threaded sleeve, characterized by this that the pitch of the screw-threaded end portion is more than one third of and less than twice the core diameter of the screw-threaded end portion and that the profile of the screw-thread at the root of the screw-thread of the end portion has a radius of curvature larger than half the pitch.

2. A coupling according to claim 1 characterized by this that the shape of the screw-thread at the crest of the screw-threads of said end portions is formed with a radius of curvature less than the radius of curvature at the root of the screw-thread.

3. A detachable drill bit provided with a screw-threaded end portion at the end opposite the cutting end having screw-threads according to claim 1.

4. A drill steel provided with a screw-threaded end portion at the end opposite the cutting end having screw-threads according to claim 1.

5. A drill rod provided with a screw-threaded end portion having screw-threads according to claim 1.

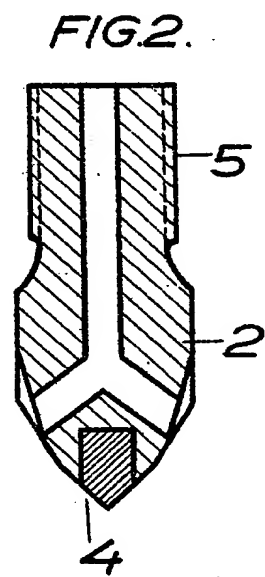
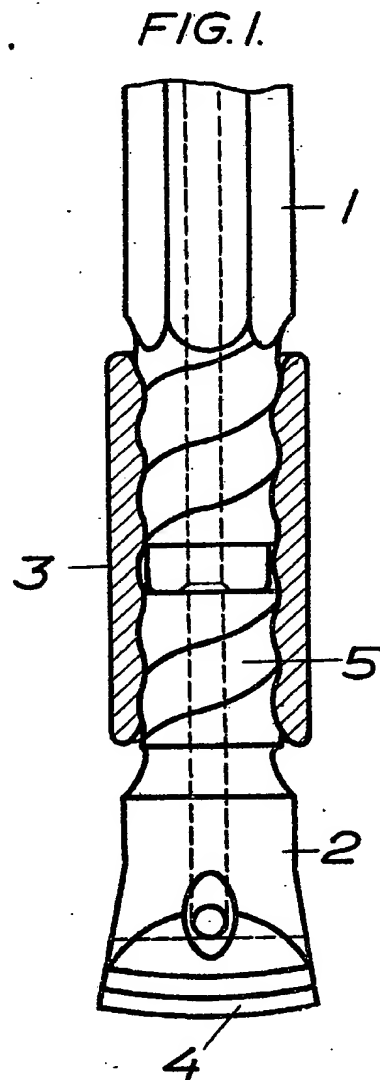
6. A coupling sleeve provided with a rounded screw-thread adapted to mesh with a screw-threaded end portion according to claim 1.
- 5 7. A drill shank forming a sleeve provided with a rounded screw-thread adapted to mesh with a screw-threaded end portion according to claim 1.
8. A coupling substantially as herein-
- before described with reference to the 10 accompanying drawing.

Dated this 2nd day of January, 1948.
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[This Drawing is a reproduction of the Original on a reduced scale.]



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